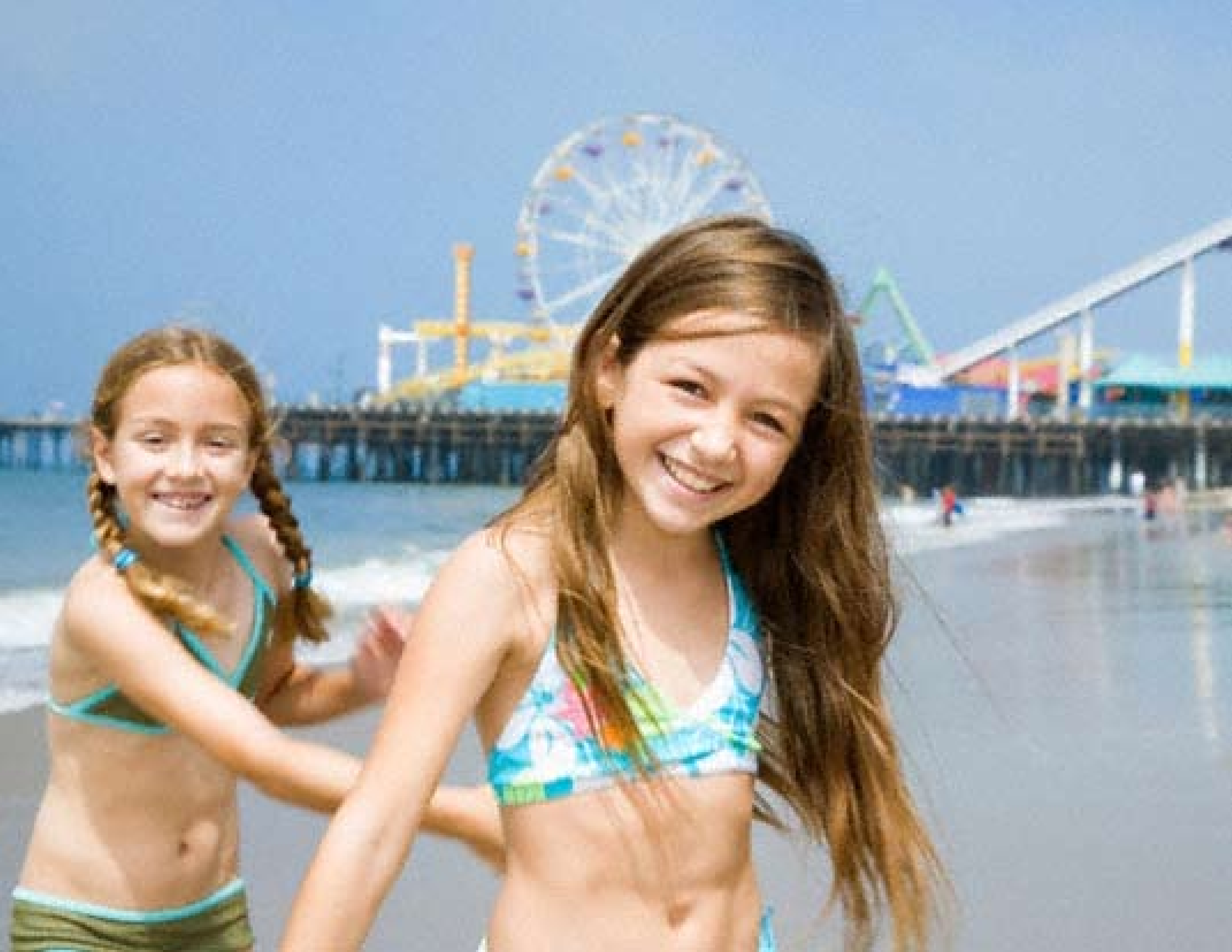


Water

THE CHALLENGE

Recent projections indicate that nearly half of the state's population will reside within the SCAG region by 2030.[1] This underscores the importance of questions about Southern California's future water supply, and of reliably meeting our urban water demands in a way that is sensitive to both ecological imperatives and the evolving emphasis on sustainable development. We also face challenges in how we assure a high-quality water supply for consumption, recreational, habitat, and other needs.

Eliminating water quality impairments throughout the region's urban watersheds is a major challenge. These impairments (usually caused by "non-point" source pollutants) are largely caused by urban and stormwater runoff and must be cleaned up under the Clean Water Act. As a result, water quality regulators are imposing significant and costly pollution control measures on local agencies in the region with compliance deadlines.

Water Supply

Water supplies within the SCAG region come from a blend of local and imported sources that will increasingly be challenged to meet the needs of a growing region. Local sources—including groundwater, surface water runoff, and reclamation—comprise about one-quarter of the region's total supplies. The balance consists of water imported from Northern California via the State Water Project (SWP) and from the Colorado River via the Colorado River Aqueduct (CRA).

Local Supplies

Groundwater. Groundwater accounts for most the region's local supply of fresh water. In California, groundwater typically provides 30 percent of the urban and agricultural water requirement. In Southern California, groundwater use tends to range between 23 percent in average years and 29 percent in dry years.[2] Groundwater basins contain a large volume of water resulting primarily from the percolation of natural runoff. Through proper management, it is also possible to use these basins as natural storage facilities.

However, the over-pumping of these basins has resulted in the overdraft of many basins (i.e., more groundwater is used than stored). According to DWR estimates, the state has a groundwater overdraft of between 1 and 2 million acre-feet (maf)[3] during average years.[4] Because of this, many water agencies have programs designed to address this imbalance. Under these programs, groundwater recharge is accomplished by diverting water to surface ponds that percolate down into the basin, or through the direct injection of water into the basins during periods of surplus.

Recycling.[5] Recycling involves the collection of wastewater from treatment plants followed by secondary treatment to make the effluent suitable for non-potable uses. The recycled water is disposed of in one of three ways: ocean outfall, live stream discharge or reuse. These uses include irrigation, commercial and industrial processes, seawater intrusion barriers and groundwater recharge. In this way, recycled water is used to free up imported water for consumptive use.

Many of the groundwater basins within SCAG's region are overdrafted and some, along the coast, are threatened by seawater intrusion. While recycled water can play an important role in both areas, cost and regulation represent barriers. While a large potential market exists for the use of recycled water for groundwater replenishment and seawater barriers, realizing this potential will require modifying existing regulations based on future studies of the health effects of recycled water[6], as well as:

- Funding contributions by all parties benefiting, directly or indirectly, from the use of recycled water.
- Reviewing recycled water regulations to ensure streamlined administration, public health and environmental protection.
- Planning and cooperative partnerships at the local, regional and statewide levels.
- Conducting additional research focusing on public perceptions and acceptance, new technologies and health effects.

These strategies can provide recycled water for potential markets, such as industrial uses (e.g., cooling tower makeup water, boiler feed water), golf courses, parks, schoolyards, cemeteries and greenbelts. Because these users tend to be high demand, continuous flow customers, they allow water utilities to base load these operations rather than contend with seasonal and diurnal flow variations, thereby reducing the need for storage and other peak demand resources.

Surface Storage. Surface storage involves the use of reservoirs to collect water for later release and use. Surface storage has played an important role in California where the pattern and timing of water use does not always match the natural runoff pattern. Surface storage can increase benefits from other water management activities such as water transfers, conjunctive management, conveyance improvements and emergency use.

While our growing population, the precarious situation in the Bay-Delta, and the prospect of early snow melt under some climate change scenarios all point to the need for increased storage capacity, there are issues. New storage can affect environmental and human conditions, create economic impacts for the surrounding community, and impact flows both up and downstream of diversions. New reservoirs may reduce property tax revenues to local governments or increase values by providing a more reliable water supply. Regulatory requirements require surface storage investigations to consider potential impacts to stream flow regimes, designated wild and scenic rivers, water quality issues, changes in stream geomorphology, loss of fish and wildlife habitat, and risk of failure during seismic and operational events. New projects may need to address additional impacts under the application of various laws, regulatory processes and statutes.[7]

Conservation. Conservation, or urban water use efficiency, involves technological or behavioral changes in indoor and outdoor residential, commercial, industrial and institutional demand that lowers the demand for water. Once invoked primarily in response to drought or emergency water shortage situations, efficiency and conservation have become viable long-term supply options, saving considerable capital and operating costs, avoiding environmental degradation, and creating multiple benefits. Conserved water can be carried over to another time if a supplier has surface or groundwater storage capacity, or stores water by agreement with an agency that maintains a groundwater bank.

A major conservation challenge is to follow the California Urban Water Conservation Council's Memorandum of Understanding and implement 14 cost-effective "best management practices" for urban conservation.[8] These efforts should target water-using devices and practices involving residential dwellings; irrigation; and commercial, industrial and institutional operations. More recently, water agency initiatives have targeted irrigation and the commercial, industrial and institutional sector. Another challenge is to reduce the common practice of over-watering yards. The resulting surface water runoff is an ongoing source of non-source point pollution that causes water impairments requiring remediation.

Desalination. Recent developments in membrane technology and plant siting strategies have increased the financial appeal of this resource option. For example, MWD estimates that its local supplies could consist of as much as 150 thousand acre-feet of desalinated water by 2050. However, several barriers must be overcome to make it a more viable water source. These include high capital and operational costs for power and membrane replacement, funding, environmental issues and addressing permitting requirements (e.g., California Coastal Commission).

Imported Supplies

Southern California has historically depended on imported water to supplement local supplies. According to 1998 estimates, the region imported more than 6 million acre-feet (maf) of water annually, accounting for nearly two-thirds of the total water used in the region.[9] Water imports are conveyed by three major facilities: The Los Angeles Aqueduct, completed in 1913 and operated by the Los Angeles Department of Water and Power; the Colorado River Aqueduct, completed in 1941 and

operated by MWD; and the State Water Project, completed in 1973[10] and operated by DWR.

State Water Project. The State Water Project (SWP), managed by DWR, is the largest state-owned multi-purpose water project in the country. It delivers water from the Sacramento Delta to 29 state water contractors, providing water to more than 23 million Californians, irrigation for 750,000 acres of agricultural lands, environmental benefits to wildlife refuges and recreational facilities.[11]

Aside from hydrology, the biggest threats to the reliability of SWP supplies are conditions within the Delta. For decades, the Bay-Delta has been the focus of competing interests: economic, ecological, urban and agricultural. These demands have combined with nature to gradually undermine the integrity of the complex system of levees that form the backbone of Bay-Delta water conveyance system. As levees erode, saltwater from the San Francisco Bay continues to encroach on the Delta, increasing salinity and undermining water quality. The presence and apparent decline of endangered species in the Delta have altered pumping operations. The prospect of long shutdowns presents a real threat to the supply reliability of all agencies drawing water from the Delta.[12]

A second concern involves the SWP's need to meet increasingly strict drinking water regulations. For example, following chlorination treatment, SWP water has disinfection by-products that require more advanced and costly treatment such as ozonation. Meeting these regulations and reducing treatment costs will require improving the Delta water supply by cost-effectively combining alternative sources of water, source improvement, and treatment facilities.

In 2000 CALFED, a collaboration of 25 state and federal agencies, released a 30-year plan for Delta restoration and long-term management. The CALFED program, currently overseen by the Bay-Delta Authority, is tasked with addressing the complex series of issues including storage, conveyance, water quality, levee system integrity, and ecosystem restoration.[13] A more recent "Delta Vision" Task Force is charged with presenting to the Governor a set of recommended actions for long-term solutions to the problem-plagued Bay-Delta ecosystem.

Colorado River. The Colorado River represents another major source of imported supply for the SCAG region. Water is conveyed from the Colorado River to urban Southern California via the Colorado River Aqueduct, owned and operated by Metropolitan.[14] Seven states share legal rights to Colorado River Water. Institutional arrangements have varied the amount of imported water available to Southern California. The need so stabilize and expand this supply will be a key challenge for the future.

Los Angeles Aqueduct. The city of Los Angeles imports water from the eastern Sierra Nevada through the Los Angeles Aqueduct (LAA). The original aqueduct was completed in 1913 to import water from the Owens Valley. In 1940 the aqueduct was extended to the Mono Basin. Water supplies have varied based on snowpack levels in Eastern Sierra Nevada and court decisions restricting the amount of water than can be imported via the LAA.[15]

Transfers and Water Banking. Following the basic principles of *Integrated Resource Planning* (IRP), urban water agencies within Southern California may continue to diversify their sources and reduce dependence on imported water by entering into contractual arrangements with agricultural irrigation districts. Irrigation agencies agree to adopt water conservation measures or to engage in land fallowing.[16] Water that would otherwise be used to irrigate crops is then purchased, or transferred, to urban water agencies. Frequently, this water is stored, or *banked*, in aquifers for use during times of shortage, thus increasing the urban agencies' supply reliability. Water banking also occurs during wet years as rainwater is directed to groundwater recharge facilities and spreading basins for use during times of shortage.

Climate Change[17]

Another challenge that overarches all local water supply issues is the global phenomenon of climate change. Current scientific research suggests that increasing concentrations of atmospheric greenhouse gases are producing global-scale temperature and precipitation changes. Models have predicted that by the end of the century, average winter temperatures could increase by more than 7 degrees, and summer temperatures could increase by as much as 18 degrees. The results of precipitation studies have been less definitive, ranging broadly between models and scenarios. Predictions from these models range from slight increases in precipitation to decreases of up to 30 percent. Nevertheless, it is an issue that water agencies are increasingly accounting for as part of the standard water planning processes.

While uncertainties exist about the exact timing, magnitude and regional impacts of these temperature and precipitation changes, researchers have identified several issues of particular importance to water resource planners. These include:

- A reduction in the Sierra Nevada snowpack
- Increased intensity and frequency of extreme weather events
- Rising sea levels resulting in
  - An increased risk of damage from storms, high-tide events and the erosion of levees.
  - Potential pumping cutbacks on the State Water Project and the Central Valley Project.

Other important issues associated with climate change include:

- Effects on local supplies such as groundwater.
- Changes in urban and agricultural demand levels and patterns.

- Impacts to human health from water-borne pathogens and water quality degradation.
- Declines in ecosystem health and function.
- Alternations in power generation and pumping operations.

Water is also a contributes to the generation of greenhouse gases through its energy demands. The energy component in developing and managing water resources is a growing challenge for the region. Energy is involved in each stage of water's use cycle: source and conveyance, treatment, distribution, consumption and wastewater treatment. In a Los Angeles Department of Water and Power analysis, the energy costs in kilowatt hours per acre foot of water (kwh/af) and CO_2 emission in pounds per acre foot of water (lbs/af) ranged as follows:

- Tertiary Treated Recycled Water: 428 kwh/af and 558 lbs/af
- Pumped Groundwater: 519 kwh/af and 677 lbs/af
- State Project Water Imports: 2580 kwh/af and 2154 lbs/af
- Seawater Desalination: 4100 kwh/af and 5345 lbs/af

In these ways, the management of energy and water supply and water quality are closely inter-related and must be considered together when regional growth and water resource strategies are developed.

These possibilities present challenges to future water planning efforts. Ongoing research concerning the likelihood and potential impacts of climate change needs to be carefully monitored and explicitly addressed by agency planning documents.

Water Demand

Water demand in California can generally be divided between urban, agricultural and environmental uses. According to DWR, for the state as a whole, these three sectors accounted for 11 percent, 41 percent and 48 percent, respectively, during 2000—a year characterized by "normal" rainfall.[18]

In the SCAG region, approximately three-quarters of potable water are provided from imported sources. Annual water demand fluctuates in relation to available supplies and the rainfall in a given year. During periods of drought, water demand can be reduced significantly through conservation while demands on imported supplies tend to decline significantly during years of above average rainfall.

An important challenge relates to the relationship between urban growth patterns and the demand for water. A compact growth pattern requires less water than a diffuse pattern. A compact regional pattern would result in fewer impervious surfaces, increasing opportunities for groundwater recharge.

Wastewater

Much of the urbanized areas of Los Angeles and Orange Counties are serviced by three large publicly owned treatment works (POTWs): the City of Los Angeles Bureau of Sanitation Hyperion Facility, the Joint Outfall System of the Los Angeles County Sanitation Districts, and the Orange County Sanitation District treatment plant. These three facilities handle more than 70 percent of all wastewater generated within the SCAG region and will be increasingly strained as the region continues to grow. In addition, medium sized POTWs (greater than 10 million gallons per day, or mgd) and small treatment plants (less than mgd) service smaller communities in Ventura County.

Water Quality[19]

Non-Point Source Pollution. Surface water resources in the SCAG region include creeks and rivers, lakes and reservoirs, and the inland Salton Sea.[20] Reservoirs serving flood control and water storage functions exist throughout the region.

Protecting the quality of water in these bodies will be an ongoing challenge. For example, lining the Los Angeles River and the Santa Ana River with concrete for flood control purposes has made them conveyance systems that concentrate and transfer urban pollutants and waste to the ocean. Estimates show that two-thirds of California's water bodies were threatened or impaired by non-point sources of pollution. Point source pollution refers to contaminants that enter a watershed, usually through a pipe (e.g., discharges from sewage treatment plants and industrial facilities). Non-point source pollution, also known as "pollution runoff," is diffuse and most evident in dry weather conditions. Non-point pollution comes from everywhere, is significantly influenced by land uses, and considered one of the major water quality problems.

A major challenge from non-point sources is the urbanizing of the region. Buildings, roads, sidewalks, parking lots and other impervious surfaces alter the natural hydrology and prevent the infiltration of water into the ground. As land is urbanized, more stormwater flows faster off the land, the greater volume increases the possibility of flooding, and the high flow rates do not allow for pollutants to settle out, increasing pollutant concentrations in the runoff. Generally, the higher the percentage of impervious surfaces, the greater the degradation in stream water quality.

The California State Water Quality Control Board has identified the following pollutants of concern in urban runoff.[21]

- Sediment. Excessive sediment loads in streams can interfere with photosynthesis, aquatic life respiration, growth and reproduction.
- Nutrients. Nitrogen and phosphorus can result in eutrophication of receiving waters (excessive or accelerated growth of vegetation or algae), reducing oxygen levels available for other species.

WATER AND OPEN SPACE

The availability of open space in the region directly impacts the quality of our water. As a direct result of the loss of open spaces in the region due to increased urbanization (and as a result increased impervious surfaces), the natural water cycle in which most of the water soaks into the ground during and after storm events, has been replaced by a paved drainage system.

As a consequence less water enters groundwater aquifers to become the supply for drinking water wells, increased run-off threatens floods and carries trash and pollutants to the ocean, and we live in an environment that is increasingly more asphalt-black and concrete-gray than green.

- Bacteria and viruses. Pathogens introduced to receiving waters from animal excrement in the watershed and by septic systems can restrict water contact activities.
- Oxygen demanding substances. Substances such as lawn clippings, animal excrement and litter can reduce dissolved oxygen levels as they decompose.
- Oil and grease. Hydrocarbons from automobiles are toxic to some aquatic life.
- Metals. Lead, zinc, cadmium and copper are heavy metals commonly found in stormwater. Other metals introduced by automobiles include chromium, iron, nickel and manganese. These metals can enter waterways through storm drains along with sediment, or as atmospheric deposition.
- Toxic pollutants. Pesticides, phenols and polynuclear aromatic hydrocarbons (PAHs) are toxic organic chemicals found in stormwater.
- Floatables. Trash in waterways increases metals and toxic pollutant loads in addition undesirable aesthetic impacts.

The general quality of groundwater in the SCAG region tends to be degraded as a result of land uses and water management practices. Fertilizers and pesticides typically used on agricultural lands infiltrate and degrade groundwater. Septic systems and leaking underground storage tanks can also impact groundwater. Water quality concerns include:

Salinity. Over-pumping can result in saltwater intrusion from the ocean, further degrading groundwater quality. Wastewater discharges can result in salt buildup from fertilizer and dairy waste. Water agencies need to work with other stakeholders on researching and developing salinity management goals and action plans, which include blending low and high salinity water and the desalination of brackish water.

Perchlorate. Ammonium perchlorate is a primary ingredient of solid rocket propellant and is used in the manufacture of munitions and fireworks. It is readily soluble in water, highly mobile in groundwater, and has significant health effects on the thyroid.[22] Small amounts gave been found in the Colorado River with higher concentrations in local groundwater basins. The challenge is to find cost-effective ways to remove perchlorates using conventional water treatment, nanofiltration and reverse osmosis.

Total Organic Carbon and Bromide. When source water containing high levels of total organic carbon (TOC) and bromide is treated with disinfectants such as chlorine or ozone, disinfection byproducts (DBP) are created. Studies show links between DBP exposure and certain cancers, as well as reproductive and developmental effects. TOCs and bromide in Delta water present challenges to monitor and maintain safe drinking water supplies. The challenge is to better protect SWP water supplies in a cost-effective manner.

Methyl Tertiary Butyl Ether and Tertiary Butanol. Until recently, MTBE was the primary oxygenate in virtually all gasoline used in California to address air pollution issues. However, MTBE has caused a serious problem, as it is very soluble in water and moves quickly into the groundwater. One gallon of MTBE alone (11% MTBE by volume) is enough to contaminate about 16.5 million gallons of water at 5 micrograms per Liter. We must find ways to reduce the cost of treating groundwater wells, or risk the temptation to seek increased imports at lower cost. A combination of advanced oxidation processes followed by granular activated carbon can reduce MTBE levels by up to 90 percent.

Arsenic. Arsenic, a naturally occurring substance in drinking water, has been identified as a risk factor for lung and urinary bladder cancer. Several local water sources contain arsenic concentrations exceeding the federal standard. It appears likely that current treatment standards will increase cost but not necessarily decrease local water supplies. However, if treatment cost increases are sufficient, some water agencies in Southern California may choose to increase their use of imported water to avoid this additional cost.

Uranium. Colorado River water has been compromised by a 10.5-million-ton pile of uranium mine tailings at Moab, Utah. Rainwater has seeped through the pile and contaminated the local groundwater, causing a flow of contaminants into the river. While the Department of Energy has agreed to move the tailings, remediating the site will require Congressional appropriations, and maintaining support for a cleanup will require close coordination and cooperation with other Colorado River users.

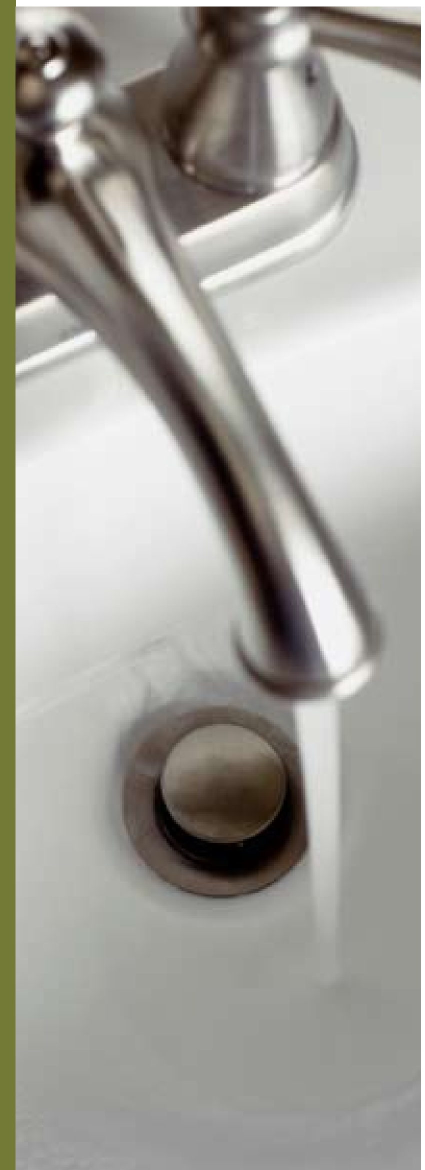
Watershed Planning

The way in which land is used—the type of use and level of intensity—has a direct effect on water supply and quality. Watershed management is the process of evaluating, planning, managing, restoring and organizing land and other resource use within an area of land that has a single common drainage point. Watershed management tries to provide sustainable development while maintaining a sustainable ecosystem.

Accommodating growth challenges us to find ways to promote compact, mixed-use development, which can reduce water demand and creates a smaller urban footprint. By reducing impervious surfaces, development generates less surface runoff, and minimizes dispersion into watersheds and groundwater recharge areas receiving this runoff.[23]

THE PLAN

The RCP focuses on three strategies for addressing water supply and quality issues. First, the region needs to develop sufficient water supplies to meet the water demands created by continuing regional growth. Second, we can improve our water quality by implementing land use and transportation policies and programs that promote water stewardship and eliminate



WATER AND OPEN SPACE

Open space and park lands have the potential to enhance groundwater water resources (by preserving or expanding the area available for natural groundwater recharge), improve surface water quality (to the extent that these open spaces filter, retain, or detain stormwater runoff), and provide opportunities to reuse treated runoff or recycled water for irrigation (thereby reducing the demand for potable water).

The loss of functional native habitat and the alteration of natural channels in urbanized areas (such as the Los Angeles River) have also reduced the extent to which natural processes can remove contaminants in urban and stormwater runoff, cycle nutrients through watersheds, and provide functional habitat for species.

water impairments and waste. Finally, the region needs to improve comprehensive and collaborative watershed planning that yields waterwise programs and projects.

IMPROVE WATER SUPPLY AND MANAGE DEMAND

The region needs to improve its stewardship of water supplies and manage demand in order to address substantial growth in population and economic activities. By promoting policies that encourage environmentally-sustainable imports, encouraging local conservation and conjunctive use, reclamation and reuse.

LAND USE AND TRANSPORTATION POLICIES

The RCP encourages development strategies that can reduce the region's impervious surfaces and reduce future impacts on surface and groundwater quality and supply. On a regional or watershed level, greater overall water quality protection is achieved through more concentrated or clustered development. Concentrated development protects the watershed by leaving a larger percentage of it in its natural condition.

WATERSHED PLANNING

Our region needs to better implement collaborative watershed planning that produces waterwise programs. By promoting better designed communities and projects, we can produce multiple benefits and ecosystem protections. This can be done by integrating local government planning efforts with those of special districts, environmental advocates and other watershed stakeholders.

WATER GOALS

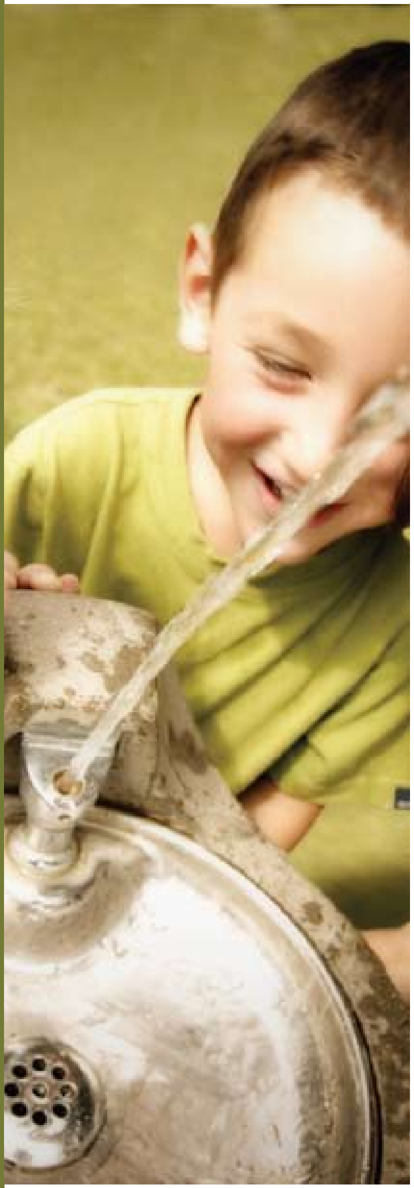
- Develop sufficient water supplies through environmentally sustainable imports, local conservation and conjunctive use, reclamation and reuse to meet the water demands created by continuing regional growth.
- Achieve water quality improvements through implementation of land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste in the region.
- Foster comprehensive and collaborative watershed planning within the region that produces waterwise programs and projects with multiple benefits and ecosystem protections, integrating local government planning efforts with those of special districts, environmental advocates and other watershed stakeholders.

WATER OUTCOMES

- Regional per capita water demand reduced by 25% by 2030 with waterwise land use and local management policies. (Local land use policies and water practices are established to maximize efficient use of local water resources and reduce water demand in the SCAG region.)

- Regional water impairments eliminated by 2030 with the use of stormwater and urban runoff controls and improved retention and infiltration systems. (Land use and transportation policies are established to minimize pollution entering water bodies and increase on-site water management.)

- All member agencies included as active participants in regional watershed planning and implementation efforts, including concurrent updating of basin plans within the region. (Coordination and collaboration of local agencies, water districts and other watershed stakeholders to maximize all investments in water management for public benefit.)



WATER ACTION PLAN

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
			SCAG Policies (SCAG policies shall be subject to consideration for future Overall Work Plans)											
X			WA-1 SCAG shall create a compendium of best management practices, case studies, and model ordinances that will give 'waterwise' guidance for development entitlements and growth management policymaking.				X							
		X	WA-2 SCAG shall promote water conservation awareness throughout the region, featuring the connections between water and other resources, including energy and the timing of water use.			X	X	X						X
	X		WA-3 SCAG shall encourage water reclamation throughout the region where it is cost-effective, feasible, and appropriate to reduce reliance on imported water.				X	X			X			X
		X	WA-4 SCAG shall encourage coordinated watershed management planning at the sub-regional level by (1) providing consistent regional data; (2) serving as a liaison between affected local, state, and federal watershed management agencies; and (3) ensuring that watershed planning is consistent with comprehensive regional planning objectives and challenges.				X	X						
		X	WA-5 SCAG shall facilitate information sharing between local water agencies and local jurisdictions throughout the region, in order to evaluate future water demands, prepare realistic Urban Water Management Plans, and support sustainable water and growth management policies.	X			X							
		X	WA-6 SCAG shall encourage the integration of water stewardship practices and unify investment incentives among all stakeholders, prioritizing resources for those investments that optimize returns and outcomes and best meet fiscal limitations, growth realities and sustainability objectives.				X							
	X		WA-7 SCAG shall provide, as appropriate, legislative support and advocacy for regional water conservation, supply, and water quality projects.				X							
	X		WA-8 SCAG shall develop a policy framework for integrating water resources planning and Compass Blueprint planning strategies in order to coordinate positive interactions between local land use policies and regional water supply and water quality actions over time.	X			X							
			Local Government Policies											
X			WA-9 Developers and local governments should consider potential climate change hydrology and attendant impacts on available water supplies and reliability in the process of creating or modifying systems to manage water resources for both year-round use and ecosystem health.				X		X		X			X
X			WA-10 Developers and local governments should include conjunctive use as a water management strategy when feasible.				X							
X			WA-11 Developers and local governments should encourage urban development and land uses to make greater use of existing and upgraded facilities prior to incurring new infrastructure costs.	X			X			X				

				Potential for Direct/Indirect Benefits									Other Benefits	
IGR/Best Practices	Legislation	Coordination	Constrained Policies	Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			WA-12 Developers and local governments should reduce exterior uses of water in public areas, and should promote reductions in private homes and businesses, by shifting to drought-tolerant native landscape plantings (xeriscaping), using weather-based irrigation systems, educating other public agencies about water use, and installing related water pricing incentives.				X	X						X
X			WA-13 Developers and local governments should protect and preserve vital land resources such as wetlands, groundwater recharge areas, woodlands, riparian corridors, and production lands. The federal government's policy of 'no net loss' for wetlands should be applied to all of these land resources.				X		X					X
X			WA-14 Local governments should amend building codes to require dual plumbing in new construction, and provide incentives for plumbing retrofits in existing development, to enable the safe and easy use of recycled water in toilets and for landscaping.	X			X							
X			WA-15 Local governments should amend ordinances as necessary to allow municipal and private outdoor use of recycled water for all parks, golf courses, and outdoor construction needs.				X							
	X		WA-16 Local governments should incentivize the use of recycled water through pricing structures that make it an attractive alternative to fresh water in non-potable situations.				X				X			
		X	WA-17 Local governments should remove salts and other contamination in the region's major groundwater basins in order to increase conjunctive use of water resources and extend groundwater storage.				X				X		X	
		X	WA-18 Local governments should create stable sources of funding for water and environmental stewardship and related infrastructure sustainability, including purchase and implementation of green infrastructure.				X		X					
		X	WA-19 Water purveyors should develop and implement tiered water pricing structures to discourage the waste of water and minimize polluting runoff.				X						X	
X			WA-20 Local governments should use both market and regulatory incentive mechanisms to encourage 'water wise' planning and development, including streamlining and prioritizing projects that minimize water demand and improve water use efficiencies.				X	X						X
		X	WA-21 Local governments should develop comprehensive partnership approaches to remove and prevent water impairments, replacing the existing regulatory command and control approach that has created delays and distrust.				X							
		X	WA-22 Local governments should create opportunities for pollution reduction marketing and other market-incentive water quality programs.				X						X	
X			WA-23 Local governments should encourage Low Impact Development and natural spaces that reduce, treat, infiltrate and manage runoff flows caused by storms and impervious surfaces.	X			X		X					
X			WA-24 Local governments should prevent development in flood hazard areas that do not have appropriate protections, especially in alluvial fan areas of the region.	X			X		X				X	

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			WA-25 Local governments should implement green infrastructure and water-related green building practices through incentives and ordinances. Green building resources include the U.S. Green Building Council's Leadership in Energy and Environmental Design, Green Point Rated Homes, and the California Green Builder Program.	X		X	X	X	X		X	X	X	X
		X	WA-26 Local governments should integrate water resources planning with existing greening and revitalization initiatives, such as street greening, tree planting, and parking lot conversions, to maximize benefits and share costs.	X		X	X		X				X	X
		X	WA- 27: Developers & LG should maximize pervious surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. New impervious surfaces should be minimized to the greatest extent possible, including the use of in-lieu fees and off-site mitigation.											
X			WA-28 Local governments should maintain and update Best Management Practices for water resource planning and implementation.				X							
		X	WA-29 Local governments should coordinate with neighboring communities and watershed stakeholders to identify potential collaborative mitigation strategies at the watershed level to properly manage cumulative impacts within the watershed.				X							
		X	WA-30 Local governments should adopt MOUs and JPAs among local entities to establish participation in the leadership and governance of integrated watershed planning and implementation.				X							
		X	WA-31 Local governments should increase participation in the implementation of integrated watershed management plans, including planning effort initiated in neighboring communities that cross jurisdictional lines.				X							
X			WA-32 Developers and local governments should pursue water management practices that avoid energy waste and create energy savings or new supplies.			X	X	X						X
State and Regional Agency Policies														
	X		WA-33 Develop fair and consistent safety guidelines for the use of reclaimed and recycled wastewater for non-potable uses, in order to facilitate more widespread acceptance and use.				X						X	
X			WA-34 Design and operate regional transportation facilities so that stormwater runoff cannot contaminating the surrounding watershed ecosystem.		X		X							

			Strategic Initiatives	Potential for Direct/Indirect Benefits									Other Benefits	
IGR/Best Practices	Legislation	Coordination		Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives (SCAG initiatives shall be subject to consideration for future Overall Work Plans)														
		X	WASI-1 SCAG shall support research into the feasibility and potential environmental impacts of saltwater desalination as a means of increasing local water supply.				X	X			X			X
		X	WASI-2 SCAG shall encourage a streamlined water quality regulatory implementation, including identification and elimination of overlaps with other regulatory programs to reduce economic impacts on local businesses and governments.				X							
X			WASI-3 SCAG shall encourage restoring all watersheds in the region to 90 percent pervious surface. Increases in pervious surfaces should be accomplished through new development models and materials, such as green roofs, porous pavement, natural stormwater management, increased park space, and expansion of the urban forest.	X			X							
		X	WASI-4 SCAG shall support improving water quality in the region's imported water supplies.				X							
		X	WASI-5 SCAG shall encourage preventing non-native/invasive species from adversely affecting regional water supplies and quality.				X							
		X	WASI-6 SCAG shall encourage the use of stormwater permits on a watershed-wide basis.				X							
		X	WASI-7 SCAG shall support the development and implementation of public education and outreach efforts at the local level regarding watershed management for community leaders and educators. In addition, SCAG will encourage the implementation of these policies at schools (K-12).				X							

[1] State of California, Department of Finance, *Population Projections for California and Its Counties 2000-2050*. Sacramento, CA. July 2007.

[2] Department of Water Resources, *California's Groundwater-Bulletin 118*. Update 2003. Located at http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm

[3] The acre-foot is a common measure of volume in discussions of water supply. An acre-foot (af) is the amount of water required to fill an acre-size area with one foot of water.

[4] California Department of Water Resources, *Draft Bulletin 118*. Updated 2003.

[5] Excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, November 2005.

[6] One concern is that the use of recycled water for groundwater recharge could adversely impact groundwater quality due to the introduction of organic contaminants, metals and salts.

[7] Excerpted from the Department of Water Resources Water Plan, Vol2, Ch. 18. 2005.

[8] See www.cuwcc.org for more information about CUWCC and the MOU.

[9] California Department of Water Resources, *Water Plan*. 1998. This estimate includes water used for agriculture.

[10] According to the California Department of Water Resources *Management of the California State Water Project*, Bulletin 132-02, p.3, January 2004: "Although initial transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be build as needed."

[11] California Department of Water Resources, *Management of the California State Water Project*, Bulletin 132-2, p. xxix. January 2004.

[12] In addition to saltwater intrusion from the San Francisco Bay, the Delta is also vulnerable to the collapse of aging levees. In June 2004, for example, a levee in the Jones Tract of the Delta failed, resulting in total inundation of the island and disrupting SWP operation.

[13] For additional information about the CALFED Program, see http://www.calwater.ca.gov/.

[14] The CRA has an annual capacity of 1.3 maf.

[15] <insert endnote>

[16] Some urban agencies also have the ability to enter "spot" water markets and to purchase water on an "as needed" basis.

[17] Excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, pp II-21-23. November 2005.

[18] Department of Water Resources, *2005 Water Plan Update*, Vol. 1, Table 3-1, p. 3-9.

[19] *Ibid*., Chapter IV. 2005.

[20] The Salton Sea, the largest inland body of water in California, was formed around 1906 when the Colorado River was accidentally diverted from its natural course. Presently, the Sea is fed by agricultural runoff from the Imperial Valley and Mexico and by the New River and the Alamo River. Without agricultural runoff the Salton Sea would dry up entirely.

[21] The following sections are excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, Chapter IV. November 2005. 10 According to the California Department of Water Resources *Management of the California State Water Project*, Bulletin 132-02, p.3, January 2004: "Although initial transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be build as needed."

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[22] Perchlorate interferes with the thyroid gland's ability to produce hormones required for normal growth and development.

[23] Excerpted from the California Department of Water Resources, *California Water Plan Update 2005*. 2005.---1

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